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| 10/560,075 | 12/09/2005 | Gang Zheng | 1694.0580004/JMC/CMB | 9659 |

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| EXAMINER | |
|---|---|
| BLAND, LAYLA D | |

| ART UNIT | PAPER NUMBER |
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| 1623 | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/560,075 | ZHENG ET AL. | |
| | Examiner | Art Unit | |
| | Layla Bland | 1623 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after t he mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *May 13, 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-36* is/are pending in the application.

4a) Of the above claim(s) *3,4,7,8,11-24 and 26-36* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,5,6,9,10 and 25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

This application is a national stage entry of PCT/US04/18143, filed June 9, 2004 which claims priority to U.S. Provisional Applications 60/476648 filed June 9, 2003, 60/537282 filed January 16, 2004, 60/540700 filed January 30, 2004, and 60/548240 filed February 27, 2004. Applicant's election with traverse of Group I, claims 1-12 and 25, and the species photodynamic therapy agents and BChlPP, dated June 13, 2007, is acknowledged.

In the response dated June 13, 2007, Ms. Bouchez asserts that because the claims of Group I and Group II are related as products and processes of use of the products, that Groups I and II share unity of invention under 37 C.F.R § 475(b)(2). However, 37 C.F.R § 475(a) states that where a group of inventions is claimed in an application, the requirement of unity of invention shall be fulfilled only when there is a technical relationship among those inventions involving one or more of the same technical features. The inventions of Groups I and II do not share a common technical feature, as noted in the Requirement for Restriction dated March 13, 2007. Therefore the restriction requirement is made final.

Claims 1-36 are pending in this application. In the response dated June 13, 2007, it is stated that it is believed claims 1, 2, 4-6, 9, 10, 13, 25-27, 31 and 32 read on the elected species. Because claim 4 depends from claim 3, which is not among the claims believed to read upon the elected species, it is also withdrawn from consideration. Claims 3, 4, 7, 8, 11, 13-24 and 26-36 are withdrawn from consideration

as being drawn to a non-elected invention. Claims 1, 2, 5, 6, 9, 10 and 25 are examined on the merits herein.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> **The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.**

Claims 1, 2, 5, 6, 9, 10 and 25 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had full possession of the claimed invention.

The claims herein are drawn to deoxyglucose conjugates represented by a deoxyglucose molecule having a linker group L and a diagnostic or therapeutic agent D. Thus, the recitation in the claims are deemed to a broad genus of any compounds which would reasonably be interpreted as glucose conjugates wherein the linker group L can be any group or, in the case of claim 2, one of a list of groups including those wherein O or S are directly attached to the glucose molecule.

The specification as originally filed does not provide adequate support for a generic claims herein. The specification merely describes glucosamine derivatives (linker group is -NH-). The specification has not exemplified conjugates having any

other linker groups (L) which are intended to be encompassed within the scope of claims.

The specification merely exemplifies compounds 5, 10, and 14 (pages 45-48) and those compounds shown in Figure 4. Each of these compounds is a glucosamine derivative.

The court of *In re Curtis* held that "a patentee will not be deemed to have invented species sufficient to constitute the genus by virtue of having disclosed a single species when... the evidence indicates ordinary artisans could not predict the operability .....of any other species." (see *In re Curtis* 354 F.3d 1347, 69 USPQ2d 1274, Fed. Cir. 2004). The court of *Noelle v. Lederman* also pointed out that generic claim to anti-CD40CR Mabs lacked written description support because there was no description of anti-human or other species Mabs, an no description of human CD40CR antigen. The court further pointed out that attempt to "define an unknown by its binding affinity to another unknown" failed. See 355 F.3d 1343, 69 USPQ2d 1508, Fed. Cir. 2004.

In this case, the claimed 2-deoxyglucose conjugates herein are deemed not to adequately described compounds wherein the linker group L is other than -NH-. Thus, ordinary artisans could not predict the operability of those compounds. Thus, the claimed 2-deoxyglucose conjugates having L other than -NH- are seen to clearly lack of written description.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

**The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.**

Claims 5, 6 and 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 5 is drawn to the conjugate of claims 1, wherein D is a photosensitive agent, an oncotherapeutic agent...an inhibitor of DNA repair **and** an α-sympathicomimetic. The structure of the claim implies that D is each and every one of the listed agents. For the purposes of examination, it is assumed that D is an agent selected from the group of agents listed in the claim.

Claim 6 recites the limitations Cy5.5 and Cy7 but does not provide a definition for the terms.

Claim 9 recites the limitations BChlPP, BChlE6, and NIR664 but neither claim 9 nor the claims from which is depends provides a definition for these terms.

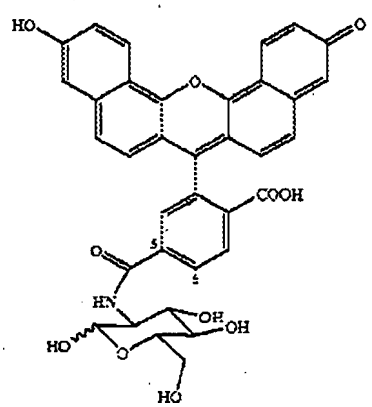
### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 5, and 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Tidmarsh et al. (U.S. 6,989,140 B2, January 24, 2006).

Tidmarsh et al. teach methods for detecting or imaging cancerous cells or tissue using a fluorophore glucose or deoxyglucose conjugate [column 5, lines 35-40]. One of example of administration of the conjugate is by oral solution, pill, or suppository [column 26, lines 2-5]. The fluorophore conjugate has the formula Fl-L-Glc wherein Fl is a fluorophore, L is a bond or a linking group, and Glc is glucose, deoxyglucose or a derivative [column 5, lines 55-60]. A fluorophore which fluoresces upon excitation by light of wavelength in the range of 500-900 nm is preferred [column 6, lines 24-31]. Specific conjugates include those of Examples 3 and 4 [columns 23-25]. The conjugate of Example 4b is shown below; in this case, the linker is -NH- and the diagnostic or therapeutic agent is carboxynaphthofluorescein. The conjugates taught by Tidmarsh et al. are photosensitive agents and tumor diagnostic agents because they fluoresce in response to light and are used to diagnose cancer.

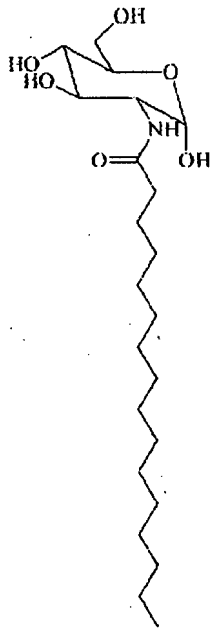


(5 isomer shown)

Thus, Tidmarsh et al. anticipates the limitations in these claims.

Claims 1, 2, and 5 are rejected under 35 U.S.C. 102(e) as being anticipated by Dufes et al. (Pharmaceutical Research, Vol. 17, No. 10, 2000).

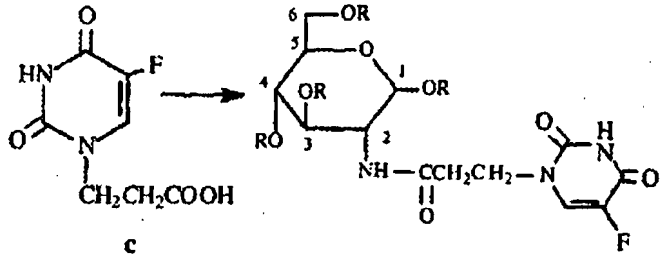
Dufes et al. teach N-palmitoyl glucosamine [Figure 1], shown below. Niosomes were prepared from this compound for use in drug targeting [see abstract].




In this case, the therapeutic agent is palmitic acid and the linker group L is –NH-. Palmitic acid is used in skin lotions and as such is considered a dermatic. Thus, Dufes et al. anticipates the limitations in these claims.

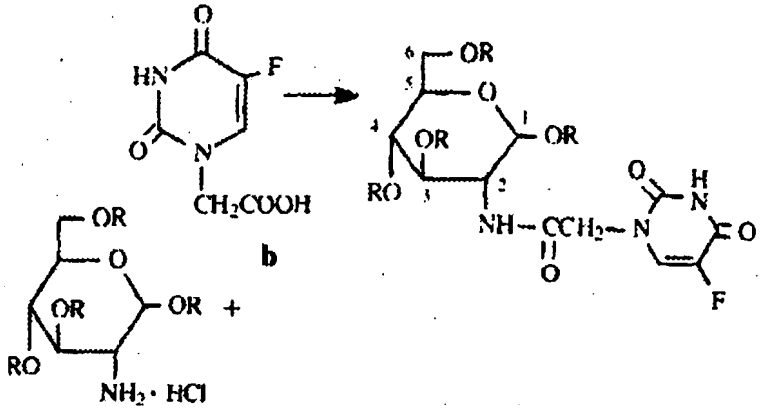
Claims 1, 2, and 5 are rejected under 35 U.S.C. 102(e) as being anticipated by Daishu et al. (Journal of Chinese Pharmaceutical Sciences 2001, 10 (4)).

Daishu et al. teach aminoglucose conjugates of 5-fluorouracil [page 193], shown below.



c

1c, R=H
2c, R=Ac
3c, R=COPh



b

1b, R=H
2b, R=Ac
3b, R=COPh

In this case, 5-Fluorouracil-1-acetic acid and 5-Fluorouracil-1-propanoic acid are each therapeutic agents and the linker group L is –NH-. These compounds exhibit antitumor activities [page 195, Table 3]. Thus, Daishu et al. anticipates the limitations in these claims.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2, 5, 6, 9, 10, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tidmarsh et al. (US 6,989,140 B2, January 24, 2006) in view of Kozyrev et al. (Tetrahedron Letters 1996 Vol. 37, No. 36, pp. 6431-6434).

Tidmarsh et al. teach as set forth above.

Tidmarsh et al. do not teach a glucose conjugate with BChlPP.

Kozyrev et al. teach the conversion of unstable bacteriochlorophyll-a into stable bacteriochlorins [see abstract]. Photosensitizers with absorption near 800 nm are desired [page 6431, first paragraph]. Bacteriopurpurins 2 and 3 [page 6431, figure] were found to be very stable at room temperature with strong wavelength absorption at 813 nm and had "ideal" photochemical properties required for an effective photodynamic therapy agent [page 6431, last two lines and page 6432, first two lines].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to prepare glucose conjugates with bacteriopurpurins, including those represented by 2 and 3 in the Kozyrev reference. The skilled artisan would have been motivated to do so because Tidmarsh et al. teach that glucose conjugates with

fluorophores are useful for cancer detection and Kozyrev et al. teach that bacteriopurpurins 2 and 3 have ideal properties for photodynamic therapy.

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dufes et al. (Pharmaceutical Research, Vol. 17, No. 10, 2000) and Daishu et al. (Journal of Chinese Pharmaceutical Sciences 2001, 10 (4)).

Dufes et al. and Daishu et al. teach as set forth above.

Dufes et al. and Daishu et al. do not teach a pharmaceutical composition comprising the respective glucose conjugates.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to prepare pharmaceutical compositions comprising aminoglucose conjugates of 5-Fluorouracil or N-palmitoyl glucosamine (NPG). The skilled artisan would have been motivated to do so with an expectation of success because 5-Fluorouracil is a cancer drug which must be administered as a pharmaceutical composition and the NPG niosomes are useful for drug targeting, which also implies a pharmaceutical composition.

A reference is good not only for what it teaches by direct anticipation but also for what one of ordinary skill in the art might reasonably infer from the teachings. (*In re Opprecht* 12 USPQ 2d 1235, 1236 (Fed Cir. 1989); *In re Bode* 193 USPQ 12 (CCPA) 1976). In light of the forgoing discussion, the Examiner concludes that the subject matter defined by the instant claims would have been obvious within the meaning of 35 USC 103(a). From the teachings of the references, it is apparent that one of ordinary

skill in the art would have had a reasonable expectation of success in producing the claimed invention. Therefore, the invention as a whole was *prima facie* obvious to one of ordinary skill in the art at the time the invention was made, as evidenced by the references, especially in the absence of evidence to the contrary.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Layla Bland whose telephone number is (571) 272-9572. The examiner can normally be reached on M-R 8:00AM-5:00PM UST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shaojia Anna Jiang can be reached on (571) 272-0627. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Layla Bland
Patent Examiner
Art Unit 1623
July 10, 2007

Shaojia Anna Jiang

7/19/07

Supervisory Patent Examiner
Art Unit 1623
July 10, 2007